ProxyServer

Internet Access with 56K DSU

Model MTPSR2-201

User Guide

MultiTech® Systems

User Guide

88301800 Revision A

ProxyServer with 56K DSU (Model No MTPSR2-201)

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Chapter 1 - Introduction and Description

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Introduction

Welcome to Multi-Tech's new DSU ProxyServer, model number MTPSR2-201, a single, secure gateway that provides multiple LAN users with high performance Internet access over a leased line. The DSU ProxyServer functions as a TCP/IP proxy server that resides on the outer edge of your firewall and provides up to 56K of bandwidth to LAN users. The DSU ProxyServer features a 10BaseT port for local LAN connection, a command port for configuration, a 56K bps DDS 4-wire WAN connection, and a RS232 port for an optional Data Communications Equipment (DCE) device (i.e., external modem, T1 CSU, etc.). System management is provided through the command port using bundled Windows® software which provides easy-to-use configuration menus.

The MTPSR2-201 also supports dial-in Remote Access Server (RAS) when the WAN 2 port is configured to support it. Refer to the Chapter 4, ProxyServer Software, and your on-line help system for more details on RAS.

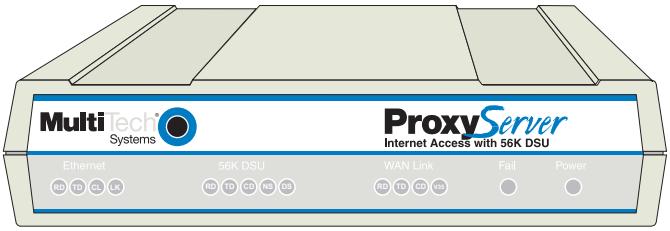

Figure 1-1. DSU ProxyServer

Preview of this Guide

This guide describes the ProxyServer and tells you how to install and configure the unit. The information contained in each chapter is as follows:

Chapter 1 - Introduction and Description

Chapter 1 describes the ProxyServer. Front panel indicator, and back panel connector descriptions are provided. In addition, a list of relevant specifications is provided at the end of the chapter.

Chapter 2 - Installation

Chapter 2 provides information on unpacking and cabling your ProxyServer. The installation procedure describes each cable connection.

Chapter 3 - Software Loading and Configuration

Chapter 3 provides instructions for software loading and initial configuration. The ProxyServer software diskettes are Windows® based. Later chapters, as well as your on-line help program will describe the ProxyServer software in more detail.

Chapter 4 - ProxyServer Software

Chapter 4 describes the ProxyServer software package designed for the Windows ® environment. This chapter describes the ProxyServer software from an applications standpoint, and in so doing, not every screen is shown, nor is each field within a screen defined. For explanations and parameters of each field within a dialog box please refer to the on-line help system provided within the software.

Chapter 5 - Remote Configuration and Management

Chapter 5 provides procedures for changing the configuration of a remote ProxyServer. Remote configuration allows you to change the configuration of a unit by simply connecting two modems between the two ProxyServers and remotely controlling the unit. Chapter 5 also describes typical client applications (i.e., Telnet and Web-based management) used for remote configuration of the ProxyServer.

Chapter 6 - Warranty, Service and Tech Support

Chapter 6 provides instructions on getting service for your ProxyServer at the factory, a statement of the limited warranty, information about our Internet presence and user bulletin board service, and space for recording information about your ProxyServer prior to calling Multi-Tech's Technical Support.

Appendixes

Appendix A - Transmission Control Protocol/Internet Protocol (TCP/IP) Description

Appendix B - Scripting

Front Panel Description

The front panel, shown in Figure 1-2, contains three groups of LEDs that provide the status of the Ethernet connection, 56K DSU port, WAN port, and general status of the ProxyServer. The Ethernet LEDs indicate the status LAN activity, the 56K DSU LEDs indicate the status of the internal DSU port (WAN 1), and the WAN Link LEDs indicate the status of the external DCE device (WAN 2). There are also two LEDs which indicate whether the self test passed or failed (Fail) and if the power On/Off switch on the back of the ProxyServer is turned On (Power).

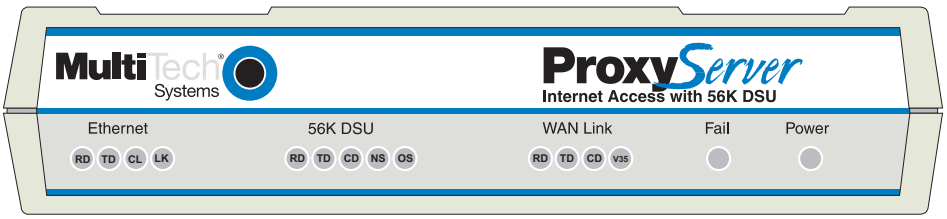

Figure 1-2. Front Panel

ETHERNET

RD Receive Data indicator blinks when packets are being received from the local area network.

TD Transmit Data indicator blinks when packets are being transmitted to the local area network.

CL Collision indicator lights when a collision is detected on the Ethernet link.

LNK Link indicator lights when the ProxyServer is connected to the local area network.

56K DSU

RD Receive Data indicator blinks when packets are being received from the wide area network.

TD Transmit Data indicator blinks when packets are being transmitted to the wide area network.

CD Carrier Detect indicator lights when a carrier signal is detected on the WAN link.

NS No Signal indicator lights when the ProxyServer is unable to detect a signal on the DSU (WAN 1) port.

OS Out of Service indicator lights when the DSU port is out of service.

WAN Link

RD Receive Data indicator blinks when packets are being received from the wide area network.

TD Transmit Data indicator blinks when packets are being transmitted to the wide area network.

CD Carrier Detect indicator lights when a carrier signal is detected on the WAN link.

V35 V.35 indicator lights when internal shunt is set for V.35 operation.

Fail

The Error indicator lights when the ProxyServer is booting or downloading setup.

Power

The Power indicator lights when power is applied to the ProxyServer.

Back Panel Description

The cable connections for the ProxyServer are made at the back panel. Connectors include Power, Command Port, 10BASET (Ethernet), 56K DSU and RS232/V.35. The cable connectors are shown in Figure 1-3 and defined in the following groups.

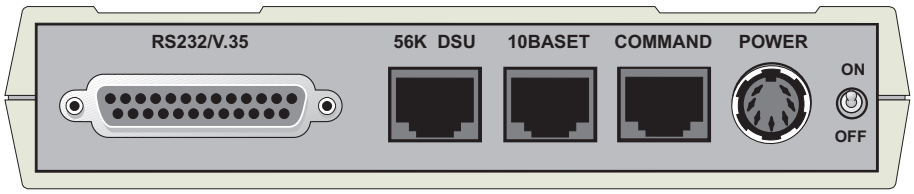

Figure 1-3. Back Panel

RS232/V.35 Connector

The RS232/V.35 (DB-25) connector is used to connect the ProxyServer to an external modem, DSU, or other Data Communications Equipment (DCE). This connection can be either RS232C (default) or V.35. If the connection is V.35, then the shunt must be moved from the default RS232 position to the V.35 position (for details on this procedure, refer to Chapter 2 - V.35 Shunt Procedure).

56K DSU Connector

The 56K DSU connector is used to connect the ProxyServer to a DDS network connection. This connector is an RJ45/48 jack.

10Base-T (Ethernet) Connector

The Ethernet 10Base-T connector is used to connect the ProxyServer to a LAN using unshielded twisted cable. This connector is an RJ45/48 jack.

Command Connector

The Command connector is used to configure the ProxyServer using a PC with a serial port and running Windows® software. The Command connector is an RJ45/48 jack and a short adapter cable is provided to convert to a standard serial port DB-25 female connector.

Power Connector

The Power connector is used to connect the external power supply to the ProxyServer. The Power connector is a 6-pin circular DIN connector. A separate power cord is connected to the power supply and the live AC grounded outlet.

Specifications

- Protocols - Point-To-Point Protocol (PPP), Multilink Point-To-Point Protocol (MLPPP), and Serial Line Internet Protocol (SLIP)
- One 1 Meg by 32 byte at 70 nanosecond SIMM is 4Mb DRAM

  Caution: SIMM speed and size cannot be mixed
- One Megg of flash memory

Ethernet Port

- Single Ethernet Interface - 10Base-T (twisted pair) RJ-45 connector.

56K DSU Port

- Single 56K bps DDS 4-wire RJ45/48 connector

Command Port

- Single 19.2K bps asynchronous Command Port using a short RJ-45 to DB-25 cable with a DB-25 female connector

WAN Link

- One 115200 bps async or T1 (1.544 M bps) sync link using a DB-25 (RS232/V.35) female connector

Electrical/Physical

- Voltage - 115 VAC (Standard), 240 Volts AC (Optional)
- Frequency - 47 to 63 Hz
- Power Consumption - 10 Watts
- Dimensions - 1.625" high x 6" wide x 9" deep

  5.63cm high x 22.34cm wide x 33.51cm deep
- Weight - 2 pounds (.92 kg)

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Chapter 2 - Installation

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Safety Warnings

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.
5. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
6. Do not use the telephone to report a gas leak in the vicinity of the leak.

Unpacking your ProxyServer

The shipping box contains the ProxyServer, external power supply, a plastic bag containing cables, your Quick Start Guide, and three diskettes (i.e., the ProxyServer User Guide, and the ProxyServer Software). Inspect the contents for signs of any shipping damage. If damage is observed, do not power up the unit, contact Multi-Tech's Technical Support for advice (refer to Chapter 6 - Warranty, Service and Tech Support). If no damage is observed, place the ProxyServer in its final location and perform the Cabling Procedure.

Save the shipping box in case reshipment is necessary.

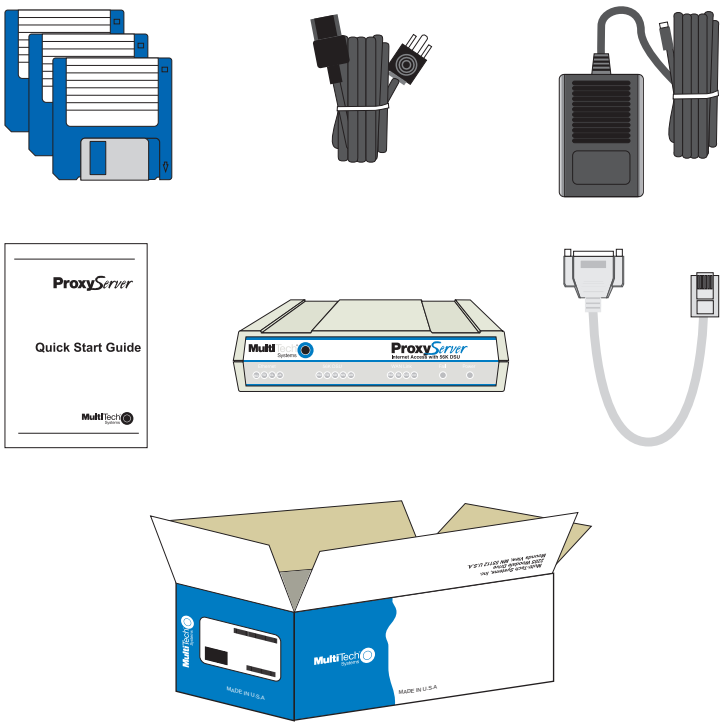

Figure 2-1. Unpacking

8-Position DIP Switch

The ProxyServer is equipped with a 8-position DIP switch. Figure 2-2 shows the DIP switch, and the chart that follows details the default positions and other options.

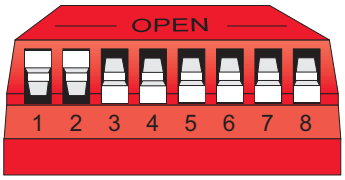

Figure 2-2. 8-position DIP switch

Position 1:	OPEN* (up)	Normal Mode operation
	Closed (down)	Loopback Mode operation
Position 2:	OPEN* (up)	DDS clocking
	Closed (down)	Internal Clocking
Positions 3 - 8:	Reserved for future use.	

* Denotes Factory Default setting

Note: The DIP switch settings cannot be changed externally; you must remove the circuit board from the chassis. Refer to the steps in the next section, V.35 Shunt Procedure, for instructions on removing the circuit board.

V.35 Shunt Procedure

If you are using an external DCE device on the WAN 2 RS232/V.35 port, and the connection will be a V.35 connection, the the interal shunt must be moved from the RS232C (default) position prior to cabling and power-up. The following steps detail the procedures for switching the shunt.

Step	Procedure
1	Ensure that the external power supply is disconnected from the ProxyServer.
2	Turn the ProxyServer over and remove the cabinet mounting screw from the chassis.

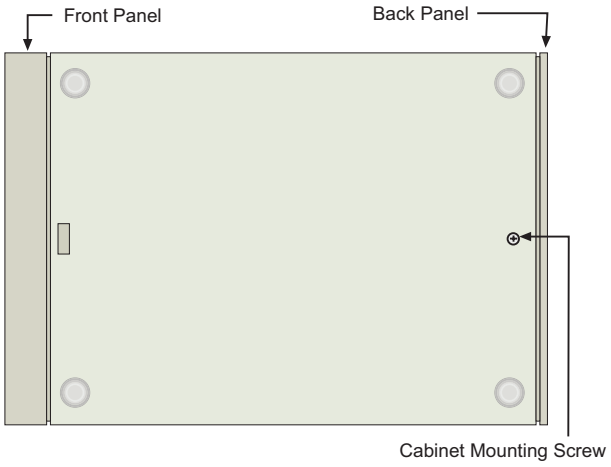

Figure 2-3. Cabinet Mounting Screw

3	Being sure to support the back panel, turn the ProxyServer right-side-up, tilt the back panel down, and slide the circuit board out of the chassis.
4	Place the unit on a flat, grounded surface with the LED's facing you.

5 Pry the shunt out of the RS232 position, and insert it in the V.35 position.

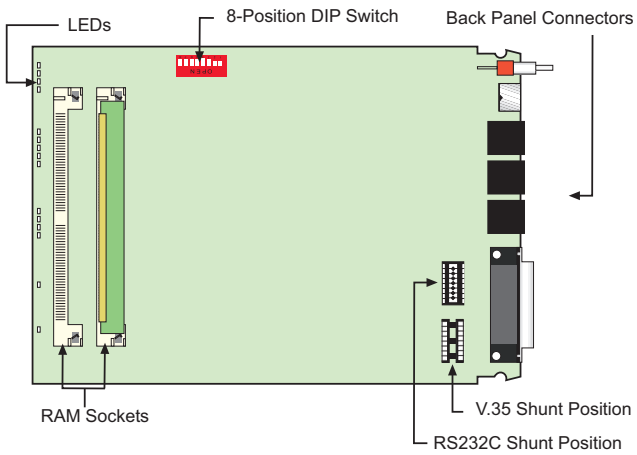

Figure 2-4. Shunt Positions

Note: if you wish to make changes to the 8-position DIP switch, do so at this time. For details on DIP switch settings, refer to the previous section, 8-Position DIP Swtich.

6 Align the board with the guide slots on the inside of the chassis and carefully slide the board back into the chassis.

7 Being sure to support the back panel, turn the ProxyServer over again, and replace the cabinet mounting screw.

8 Turn the ProxyServer right-side-up again and proceed to the nect section to connect the cables.

Cabling Your ProxyServer

Cabling your ProxyServer involves making the proper Power, Command Port, Ethernet and 56K DSU connections. An optional WAN connection is provided to connect to an external WAN device. Figure 2-5 shows the back panel connectors and the associated cable connections.

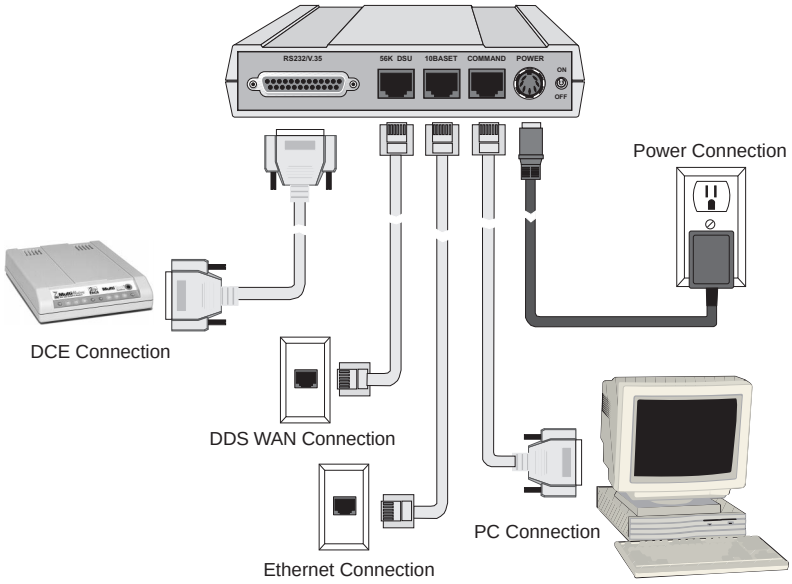

Figure 2-5. Cable Connections

The following steps detail the procedures for connecting the cables to your ProxyServer.

Note: before proceeding with this procedure, verify that the DIP switch has been set to the proper clocking method. Refer to the 8-Position DIP Switch section, earlier in this chapter.

1. Connect one end of the power supply to a live AC outlet and connect the other end to the ProxyServer as shown in Figure 2-2. The power connector is a 6-pin circular DIN connector.

2. Connect the ProxyServer to a PC by using the short RJ-45 to DB-25 (female) cable provided in your unit. Plug the RJ-45 end of the cable into the Command port of the ProxyServer and the other end into the RS232 cable from the PC serial port. See Figure 2-2.

3. Connect one end of an RJ-45 (UTP) cable to the 10BASET connector on the back of the ProxyServer. Connect the other end of the cable to your LAN.

4. If the RS232/V.35 connector on the ProxyServer is going to be connected to a DCE device (i.e., external modem, CSU, etc.) connect one end of an RS232 or V.35 interface cable to the RS232/V.35 connector on the back of the ProxyServer. Connect the other end of this cable to the DCE device.

6. Turn on power to the ProxyServer by placing the ON/OFF switch on the back panel to the ON position. **Wait** for the Fail LED on the ProxyServer to go OFF before proceeding. This may take a couple of minutes to go OFF.

At this time your ProxyServer is completely cabled. Proceed to Chapter 3 - Software Loading and Configuration,to load the Proxy Server software.

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Chapter 3 - Software Loading and Configuration

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Loading the Proxy Server Software

The following loading procedure does not provide every screen or option in the process of installing the ProxyServer software. The assumption is that a technical person is doing the installation and that a thorough knowledge of Windows and the software loading process is understood. Additional information on the ProxyServer software is provided in Chapter 4 - Proxy Server Software, as well as in the on-line help system provided with the software.

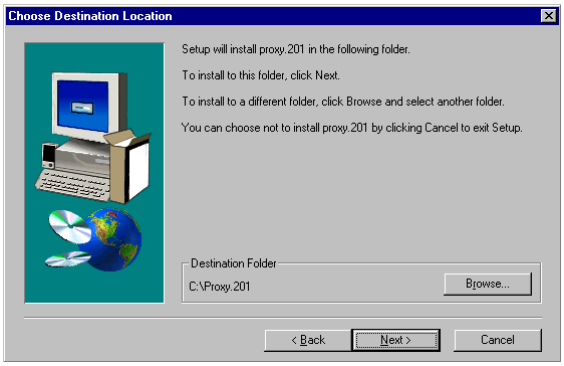
1. Run Windows on the PC connected to the Command Port.

2. Insert the ProxyServer diskette labeled Disk 1 into the disk drive on the PC connected to the Command port.

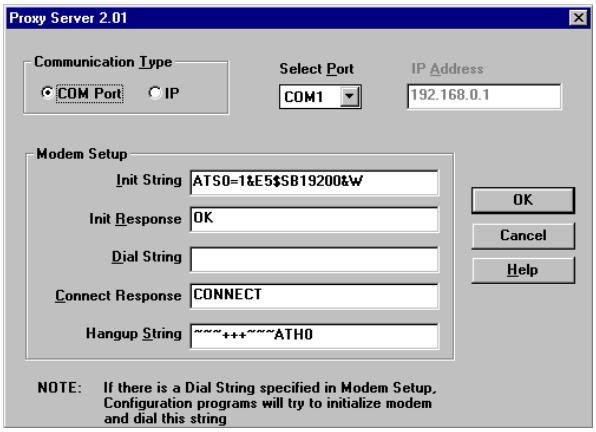
3. **Win3.1 users** - access the setup program in the File Manager by clicking **File | Run**. In the Run dialog box, type **a:\setup** or **b:\setup** (depending on the location of your floppy disk drive) in the Command Line field and then click **OK**.

   Win95 users - click **Start | Run**. In the Run dialog box click on the down arrow and choose **a:\setup** or **b:\setup** (depending on the location of your floppy disk drive) in the Command Line field and then click **OK**.

4. Follow the on-screen instructions to install your ProxyServer software.



5. The following dialog box selects the COM port of your PC connected to the Command port of the ProxyServer. From the **Select Port** window, click on the down arrow and choose the COM port of your PC.

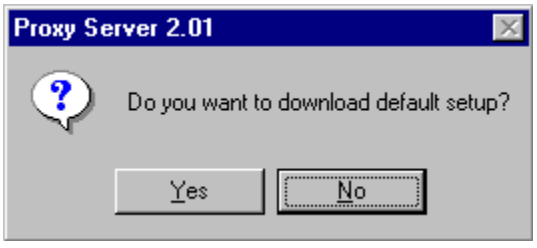


Click **OK** to continue.

6. The following screen appears.

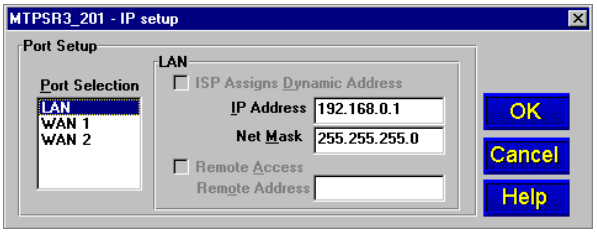
Click **Finish** to continue.

7. The following screen appears.



Click **Yes** to download the default setup.

8. The **IP Setup** dialog appears.



8. Select the proper port from the **Port Selection** list.

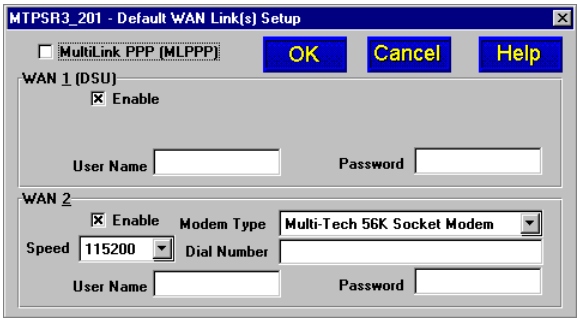
   By default, **LAN** is selected. Change the default **IP Address** and **Net Mask** to your unique LAN address.

   Highlight **WAN 1**, and choose either **ISP Assigns Dynamic Address** (default) to allow the ISP to automatically assign the ProxyServer IP address and Net Mask, or disable **ISP Assigns Dynamic Address** by clicking the check box, and statically assign the **IP Address** and **Net Mask**.

   If you wish to configure the WAN 2 port, highlight **WAN 2** and either configure it as you did with WAN 1, above, or click **Remote Access** to enable support of Remote Access Server (RAS) on WAN port 2. If you enable Remote Access, you must assign the address of the remote server in the **Remote Address** field.

   When you have completed the IP port configuration, click **OK** to continue.

9. The **Default WAN Link(s) Setup** dialog is displayed.



   If you wish to use MultiLink PPP, click the **MultiLink PPP (MLPPP)** checkbox to enable MLPPP. Please note that the User Name and Password for both WAN 1 and WAN 2 must be identical to use MLPPP.

10. In the **WAN 1 (DSU)** group, enter the **User Name** and **Password** for WAN port 1, as agreed upon with your ISP. Click on the **Enable** check box if you wish to disable WAN 1.

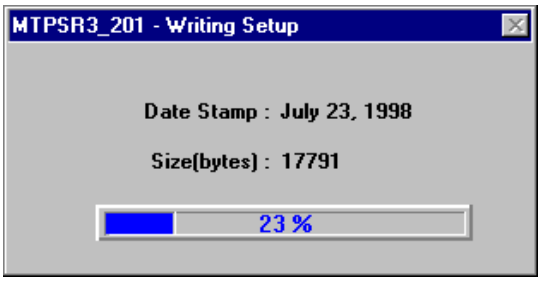
11. In the **WAN 2** group, configure the parameters of the external DCE device attached to the WAN 2 port. If the external device is a modem, click on the drop down list in the **Modem Type** field and choose the proper modem type. Enter the telephone number of the ISP in the **Dial Number** field. Assign the **User Name** and **Password** for WAN port 2, as agreed upon with you ISP.

    Note: If you enabled MLPPP in step 9, make sure that the User Name and Password for WAN 2 is the same to the User Name and Password you assigned to WAN 1. In order to make use of MLPPP, both WAN ports must have identical entries in these fields.

    If you do not wish to use the WAN 2 port, click on the **Enable** check box disable WAN 2.

    When you are finished, click **OK** to continue with the installation.

11. The configuration is written to the ProxyServer and the following screen is displayed.



12. After the setup is written to the ProxyServer, the unit is rebooted.

13. Check to ensure that the **FAIL** LED on the ProxyServer is off after the download is complete and the ProxyServer is rebooted.

27. **Win3.1 users** - you are returned to your Program Manager where the Proxy Server program group and Program Item (Windows icons) have been created.

    Win95 users - you are returned to your Proxy Server folder which will be visible on your desktop.

Your ProxyServer is operational at this time.

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Chapter 4 - Proxy Server Software

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Introduction

This chapter describes the Proxy Server software from an applications standpoint, showing how to make changes in the configuration with recommendations on the impact of any such changes. The major configuration parameters were set when the software was loaded into your PC and the setup configuration was downloaded to the ProxyServer at the conclusion of the software installation. The Proxy Server software is designed for the Microsoft Windows™ environment.

Recommendations are provided to explain that changing parameters may affect your unit in a certain way. Our intent is not to cover every dialog box nor every field within a dialog box. The ProxyServer on-line help provided with your software provides such definitions, along with explanations of parameters and defaults where applicable. This constitutes a dynamic help system in that the information presented always relates to the dialog box or window that is currently open.

Before You Begin

Your Proxy Server 2.01 program group contains several applications which provide the maximum flexibility for configuration and use. These utilities are accessible in Windows by clicking **Start | Programs | Proxy Server 2.01 | *(utility)***. The various options include Configuration Port Setup, Download Default Setup, Download Firmware, Proxy Server Configuration, Remote User Data Base, Uninstall Proxy Server Configuration and Wan Device Configuration. Proxy Server Configuration will be discussed in detail later in this chapter. A brief description of the other components is provided here:

Download Firmware

This utility allows you to download the firmware of the ProxyServer. This may be necessary in the case of repair or upgrade. To download the firmware, choose **Download Firmware** from the Proxy Server 2.01 program group, and the **Open** dialog box is displayed (if the ProxyServer is running, you will be queried to reboot to update firmware; click **OK** to proceed and the **Open** dialog will be displayed).

By default, the software will display the proper firmware from the Proxy Server folder. Double click on this file in the **File Name** list.

The Downloading Code dialog is displayed, which includes a status bar to monitor the download. When the download is complete the ProxyServer will reboot. This process will take several minutes. After rebooting, you will be returned to Windows.

Configuration Port Setup

The Configuration Port Setup utility allows you to set up and configure the command port on your ProxyServer. This dialog is included in the initial installation process. Although parameters can be changed, be sure to note the current status of the software before making any alterations.

When you installed the ProxyServer software, you selected to configure the port as either an IP or COM Port. When COM Port is selected, you can assign the proper COM Port and define the modem Init String, Dial String, and various responses. If IP is selected, you can assign a static IP address or select one from the drop down list. For more information on each individual parameter, refer to the on-line help provided with the software.

Download Default Setup

This feature allows you to download the default settings, configured during installation, to the ProxyServer. If you are installing for the first time, you will download this setup at the end of the installation before operating the ProxyServer. If you have made changes to the Proxy Server Configuration and wish to revert to the default setup, you can do so through the Proxy Server 2.01 program group.

Choose **Download Default Setup** to download the factory default settings. If the ProxyServer is running, you will be queried to reboot. Click **Yes** to continue with the download. You will then be presented with two dialogs including **IP Setup** and **Default WAN Link(s) Setup**. These screens will contain the original setup information. Click **OK** on each to accept the default settings, or make any necessary changes and then click **OK**. When prompted, click **OK** again to proceed with the download. The default setup will be written to the ProxyServer. This process may take a few minutes. When it is finished, you will be returned to Windows.

Remote User Data Base

This utility allows you to gather information about your remote users. You can add and remove remote users from the data base, or edit information regarding remote users already in the data base.

Choose **Remote User Data Base** from the Proxy Server 2.01 program group, and the **MTPSR2-201 Users List** dialog will appear. From this dialog you can choose Add, Edit or Delete. When you have completed all the necessary changes, click **Download** to save the new information to the ProxyServer. Refer to your on-line help for a more detailed description of parameters with the data base.

Uninstall Proxy Server Configuration

Selecting Uninstall Proxy Server Configuration will allow you to completely remove all the components of the Proxy Server 2.01 program group. Upon selecting this option your will be queried for confirmation. Click **Yes** to continue with the uninstall, or click **No** to abort.

Note: You will not be able to use the ProxyServer without Proxy Server Configuration. If you remove the components, you will need to reinstall the software. Refer to your *DSU ProxyServer Quick Start Guide* for installation instructions.

WAN Device Configuration

If you have an external WAN device connected to the WAN port of the ProxyServer, this application will open the Proxy Server Print Console, a terminal emulation program, that will allow configuration of external devices.

Proxy Server Configuration

To view or change your ProxyServer configuration in Windows 95, click **Start** | **Programs** | **Proxy Server 2.01** | **Proxy Server Configuration**, or double click on the ProxyServer Configuration icon in the Proxy Server 2.01 program group. After loading, the **Proxy Setup** menu will appear.

The **Proxy Setup** menu consists of 13 buttons which allow you to display and change the IP Protocol, define the output of the ProxyServer, change features such as Internet, DHCP Server, ProxyServer, Virtual Server, display WAN port statistics, control activation of additional applications and dumb terminal management, test the communications link, print messages received from the target ProxyServer and download setup information to the ProxyServer.

In the bottom row, there are buttons to open the on-line Help system (Proxy Server Setup Help) and end (Exit) a Proxy configuration session. Also, should you happen to fail to connect with the target ProxyServer, a “Retry” button appears temporarily to the left of the Help button.

Typical Application

A typical application for a ProxyServer is shown in Figure 4-1 below. In this application, the ProxyServer has been configured for a 56K DSU leased line connection to the Internet. The LAN users at the various workstations on the LAN share dial-up services to the Internet and the ProxyServer maintains secure access to the network from the Internet.

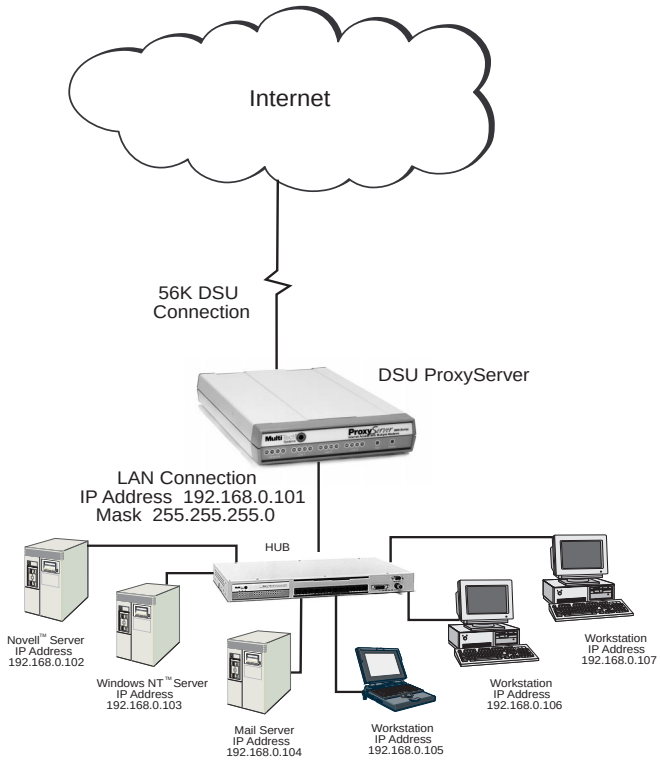
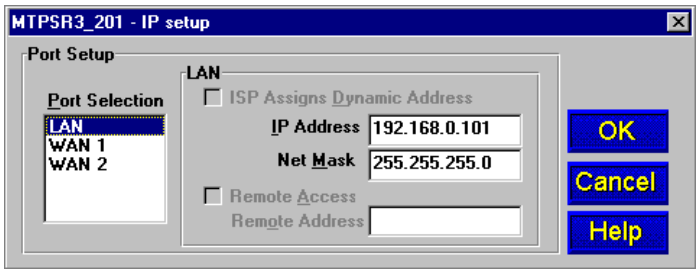


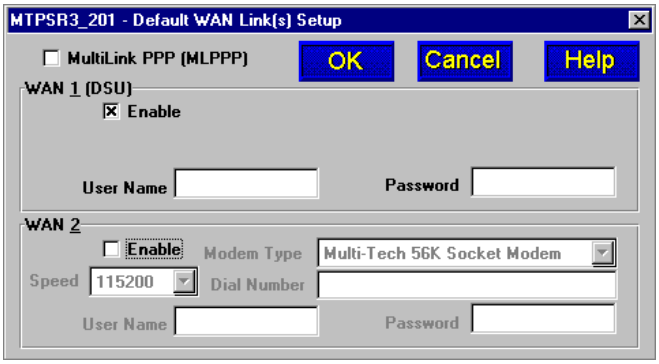
Figure 4-1. Typical Application

In the typical application above, the default settings for both the LAN Port and the 56K DSU Port were configured during installation and loaded into the ProxyServer at the conclusion of the setup.

The IP Address that was entered during setup is the IP address of the ProxyServer (192.168.0.101).



The WAN ports were configured during setup so that WAN 1 (DSU) is enabled and WAN 2 is disabled.



The sections that follow provide examples of how to add some of the advanced features that enhance and build upon this basic setup.

Adding an Optional DCE Device

In the application shown below, the ProxyServer has been configured for both a 56K DSU leased line connection to the Internet, and an RS232/V.35 connection via the WAN 2 port (i.e., external modem, T1 CSU, etc.). Each WAN port can be configured with a unique User Name and Password or, as in this application, can be configured to use Multi-Link PPP (see, Enabling Multi-Link PPP, in this chapter for more details). The LAN users at the various workstations on the LAN share dial-up services to the Internet and the ProxyServer maintains secure access to the network from the Internet.

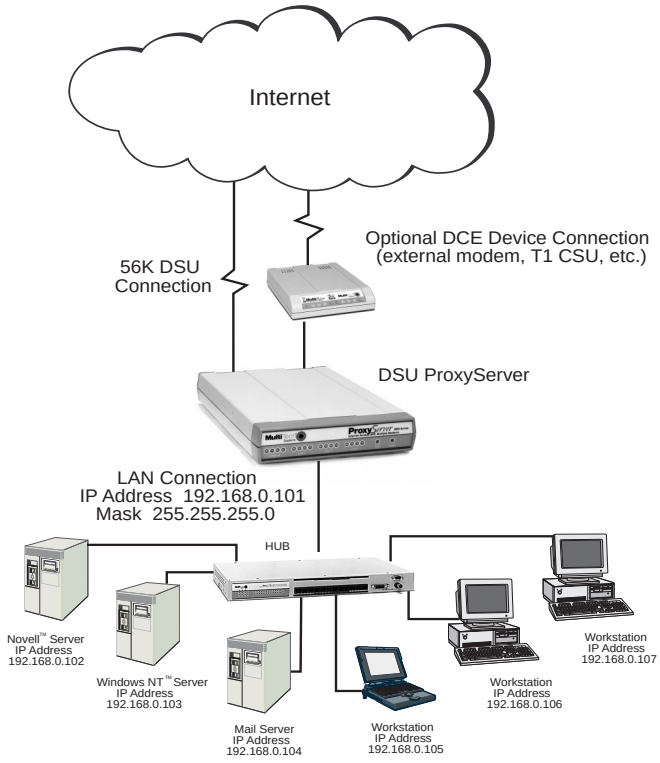
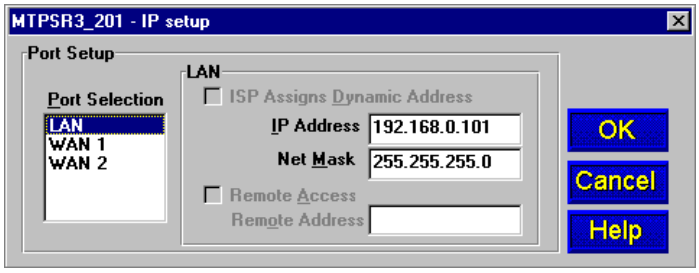


Figure 4-2. Application with optional DCE Device

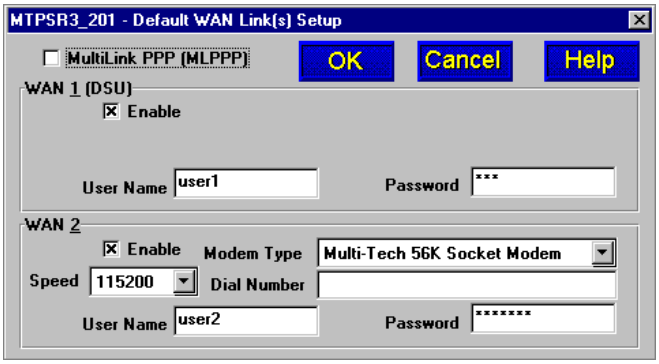
In the typical application above, the default settings for the LAN Port, 56K DSU Port and the WAN 2 (RS232/V.35) Port were configured during installation and loaded into the ProxyServer at the conclusion of the setup.

The IP Address that was entered during setup is the IP address of the ProxyServer (192.168.0.101).



The WAN ports were configured during setup so that both the WAN 1 (DSU) and WAN 2 ports are enabled.

The **User Name** and **Password** for both ports are unique to the port, and WAN 2 has been configured for use with an external modem (the Dial Number field should be configured with the telephone number of the ISP).

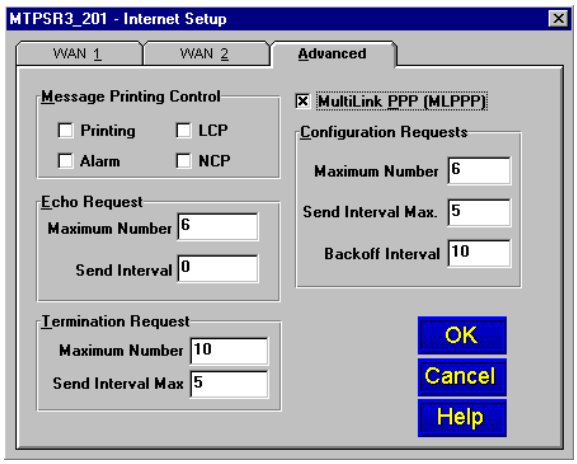


Enabling Multi-Link PPP

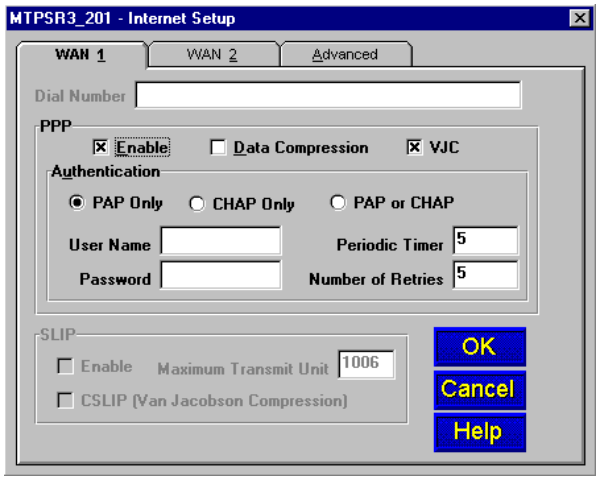
If you have an optional DCE device connected to WAN 2, the ProxyServer can be configured to make use of Multi-Link Point-to-Point Protocol (MLPPP). This feature allows the ProxyServer to bond the WAN ports (56KDSU and RS232/V.35) together and dynamically allocate bandwidth to LAN users. By this method, a single LAN client could make use of both WAN ports until another client requires access, at which time the ProxyServer shares the WAN ports between the clients.

To enable MLPPP, click on the **Internet** button in the **Proxy Setup** menu. The **Internet Setup** dialog box appears.

Click on the **Advanced** tab and check **MultiLink PPP** to enable MLPPP on the WAN ports.



Click on the **WAN 1** tab and enter a **User Name** and **Password**, as agreed upon with your ISP.



Click on the **WAN 2** tab and enter the *identical* User Name and Password.

Note: The User Name and Password must be the same for both WAN 1 and WAN 2 to use MLPPP.

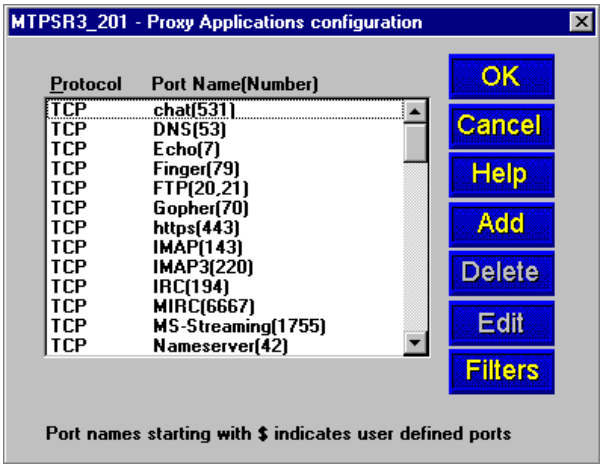
When you have finished the configuration, click **OK**. You are returned to the Proxy Setup menu. Click **Download Setup** to save the new configuration to the ProxyServer.

Adding Proxy Applications

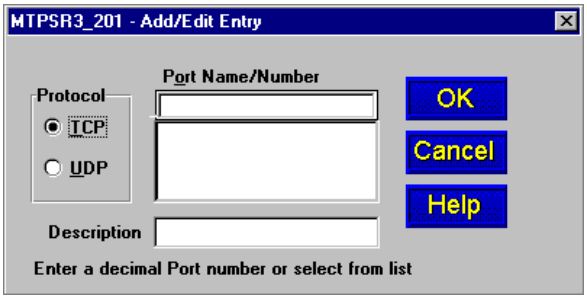
Certain software on your LAN may require a TCP or UDP port usage that is not currently supported by the ProxyServer. If this is the case, you can refer to RFC 1700 on the Internet which defines the Internet Protocol suite. RFC 1700 identifies the parameters, such as Internet address, domain names, autonomous system numbers, protocol numbers, port numbers, and much more. Once the necessary information has been determined, you can add the application(s) to the supported list. Without this information, the Proxy will not allow packets through to the Internet from the unknown software.

This list includes many of the most common port usages, however, not all are included because an increase in the number of port usages supported means a *possible* decrease in performance speed, and an increased security risk.

If you wish to add ProxyServer applications that are not currently supported, click on the **Proxy Server** button in the **Proxy Setup** menu. The **Proxy Applications Configuration** dialog box appears. This menu includes a list of all the applications currently supported by the ProxyServer.



Click on the **Add** button. The **Add/Edit Entry** dialog box appears.



This dialog will allow you choose the desired protocol, and enter a **Port Name/Number** and **Description**. After you have entered these items, click **OK** to add the port usage to the list of supported usages.

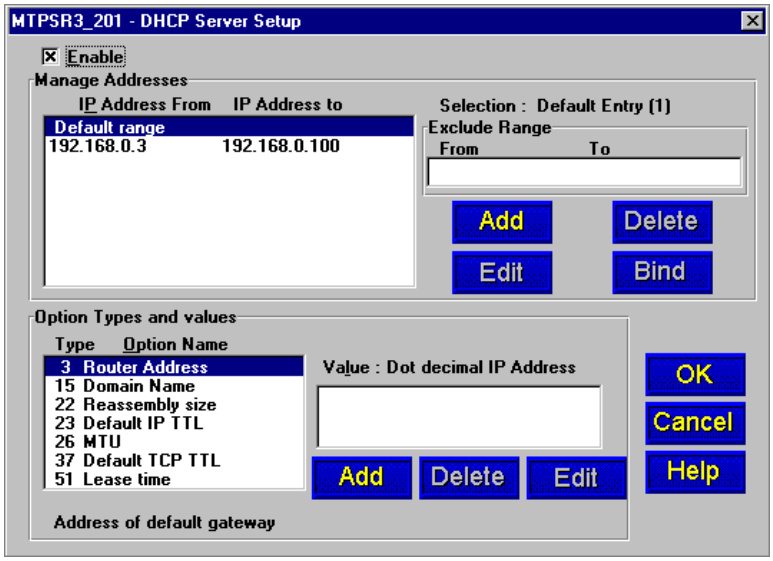
When you have completed the additions/edits, click **OK**. You are returned to the Proxy Setup menu.

Click **Download Setup** to save the new configuration to the ProxyServer.

Enabling the DHCP Server

The DHCP Server feature of the ProxyServer manages all IP address assignments within a workgroup. IP address management becomes completely transparent.

To enable the DHCP Server ability in the ProxyServer, click on the **DHCP Server** button in the **Proxy Setup** menu. The **DHCP Server Setup** dialog box appears.



The **DHCP Server Setup** menu allows you to customize each client PC configuration from one central point. You can establish a range of client addresses in the **Manage Addresses** group. You can then exclude specific addresses from that range in the **Exclude Range** field. You can also add, delete, edit and bind addresses using the corresponding buttons in this group.

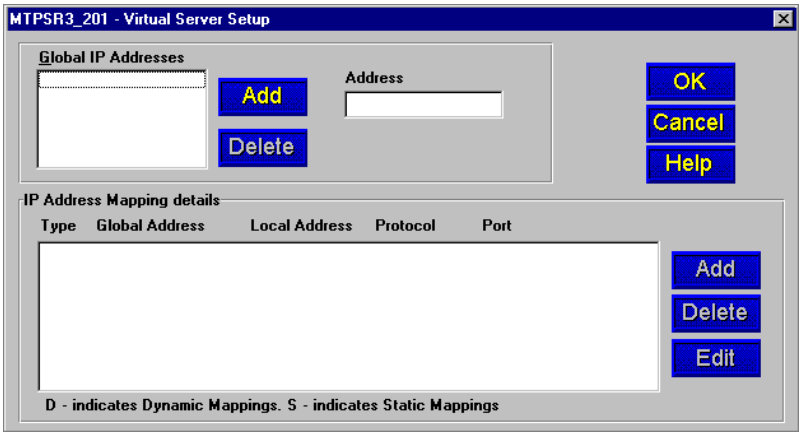
The **Option Types and Values** group on the bottom portion of the menu allows you to customize the configuration of the client platform. Again, you can add, delete and edit an option by highlighting it and clicking on the appropriate button. You cannot, however, edit or delete entries provided in the default list.

Once you have completed changes, click **OK**. You are returned to the Proxy Setup menu. Click **Download Setup** to save the new configuration to the ProxyServer.

Enabling Virtual Servers

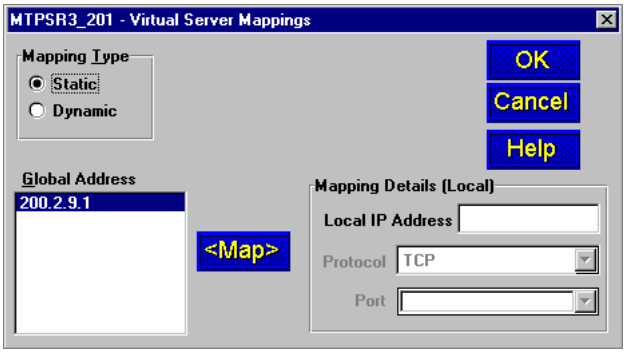
The Virtual Server Setup dialog box allows you to assign a virtual address to a statically assigned server. For example, if the ISP assigns static address of 200.2.9.1, you can set up a virtual server so that any requests sent to 200.2.9.1 will access 192.168.0.102.

Click on the **Virtual Servers** button in the **Proxy Setup** menu. The **Virtual Server Setup** dialog box appears.



To add a Virtual Server, type a valid IP address (200.2.9.1 in our example) in the **Address** field and then click **Add** in the **Global IP Addresses** group. The new address appears in the Global IP Addresses list.

Click **Add** in the **IP Address Mapping Details** group. The **Virtual Server Mappings** dialog box appears.



In the **Mapping Type** group, click on either **Static** or **Dynamic**. This will determine whether protocol and port usage will be entered statically, or assigned automatically by the server.

If the **Mapping Type** is **Static**, then enter the **Local IP Address** that the Global Address will be mapped to in the **Local IP Address** field, and click **Map**.

If the **Mapping Type** is **Dynamic**, then enter a **Local IP Address**, **Protocol** and **Port** in the appropriate fields and click **Map**.

The new mapping will be displayed in the **IP Address Mapping Details** group list.

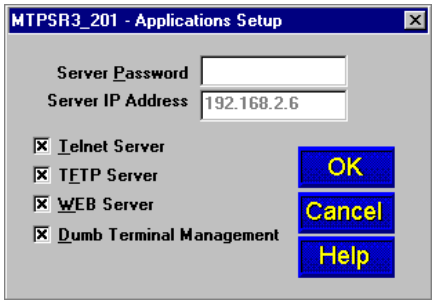
When you have finished, click **OK**. You are returned to the Proxy Setup menu.

Click **Download Setup** to save the new configuration to the ProxyServer.

Applications

In addition to local configuration, the ProxyServer supports various applications which allow it to be configured remotely from anywhere on the connected Internet. To manage these applications, click **Others** in the **Proxy Setup** menu.

The **Applications Setup** dialog box appears.

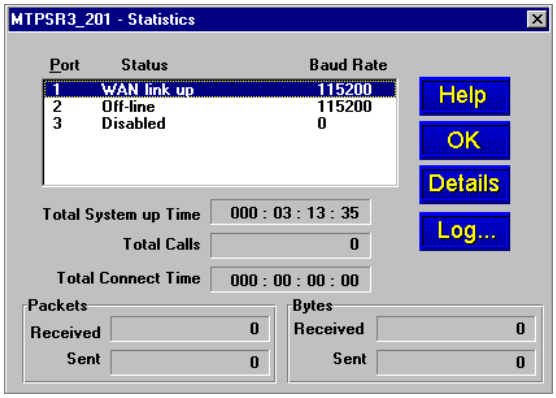


Enter a valid **Server Password** and **Server IP Address** (the IP address of the ProxyServer) and then verify that the desired applications are enabled. By default, the ProxyServer supports Telnet, TFTP, WEB, and Dumb Terminal management. If you wish to disable any of these applications, click the corresponding check box to disable support.

For more information on using these remote configuration applications, please refer to, Chapter 5 - Remote Configuration and Management.

Statistics

The ProxyServer is capable of providing statistics for each port and for the whole system. These statistics can be useful for troubleshooting and management purposes. To access this information, click **Statistics** in the **Proxy Setup** menu. The **Statistics** dialog box is displayed.

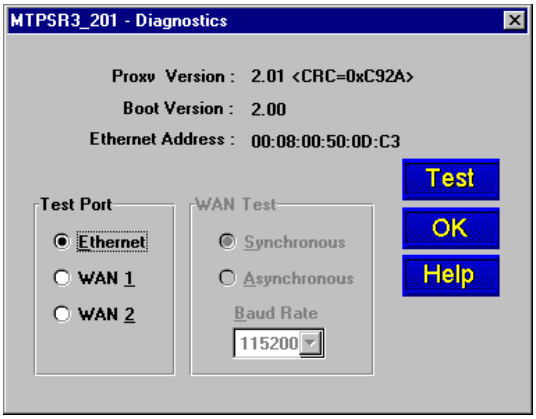


From this menu, you can query the details of a specific port or observe total system statistics such as Total Up Time, and Total Calls. In addition, statistics can be saved to a log file for future use.

For more details and parameters about specific fields within the statistics dialog, refer to the on-line help.

Diagnostics

The ProxyServer is equipped with a built-in diagnostics utility that can be accessed through the COM port of your PC (remote users cannot access diagnostics). Click **Built-in Test** in the **Proxy Setup** menu and the **Diagnostics** dialog is displayed.

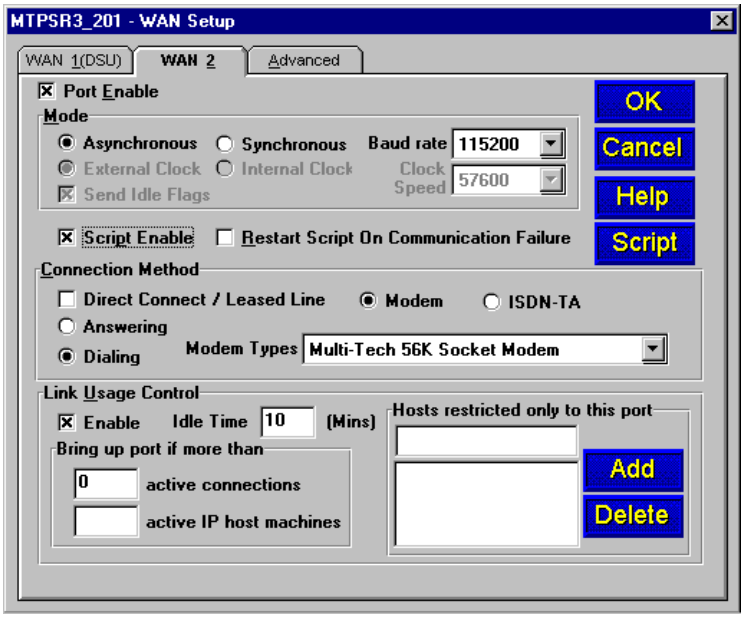


Select the port you wish to run diagnostics on from the **Test Port** group (Ethernet, WAN 1 or WAN 2), then click **Test** to start the test.

For more details and parameters about specific fields within the diagnostics dialog, refer to the on-line help.

Scripting

To enable scripting, click **WAN** from the **Proxy Setup** menu, and click on the **WAN 2** tab (scripting cannot be enabled on the WAN 1 (DSU) port).



Click on the **Script Enable** check box to enable scripting. Click **Script** to access scripting options. The **Script Dialog** menu is displayed. From this menu, you can edit, compile and download scripts.

For more information on scripting, refer to Appendix B - Scripting.

ProxyServer
Internet Access with 56K DSU

Chapter 5 - Remote Configuration and Management

MultiTech® Systems

Introduction

This chapter provides procedures for changing the configuration of a remote unit. Remote configuration allows a PC at one site (local site) to dial a remote ProxyServer and change the configuration of that remote unit. Remote configuration can be accomplished either directly through the LAN or remotely using modems. To remotely configure a ProxyServer, a local PC needs to be connected to a dial-up line and the ProxyServer software configured to call the remote ProxyServer. The remote ProxyServer needs to have a modem connected to a dial-up line and the Command Port. Once the connection to the remote unit is made, you can change the configuration as you see fit. Once the configuration is changed, you can down load the new configuration to the remote ProxyServer. Refer to the Modem-Based Remote Configuration Procedure to remotely configure a ProxyServer.

To configure the remote ProxyServer through the LAN, change the communication type to the IP based Trivial File Transfer Protocol (known as TFTP) and change the configuration as you see fit. Refer to the LAN-Based Remote Configuration Procedure in this chapter to configure a remote ProxyServer.

Modem-Based Remote Configuration Procedure

1 At the remote site, remove the serial cable from the PC to the Command Port connector on the back panel of the ProxyServer.

2 At the remote site, connect a special cable (Remote Configuration Cable) to the Command Port connector on the back panel of the ProxyServer and the RS232 connector on the modem. The special cable is a serial cable with male connectors on both ends. Refer to Appendix A for cable details.

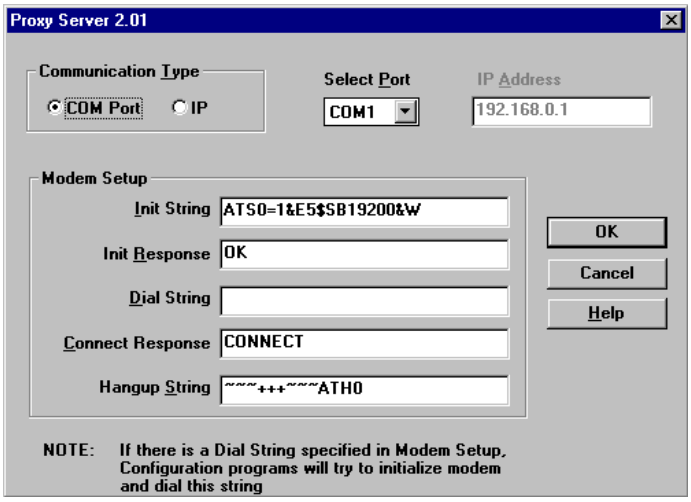
Connect the modem to your local telephone line.

Provide your telephone number to the person verifying your configuration.

3 At the main site, connect your local PC to a modem that is connected to a dial-up line.

4 Install the ProxyServer software on the local PC. When installed, click **Start | Programs | Proxy Server 2.01 | Configuration Port Setup**, or double click on the **Configuration Port** icon in the ProxyServer 2.01 program group.

5 The Proxy Server Setup dialog box is displayed.



Verify that the **Communication Type** is set for **COM Port** and the **Select Port** field is set for the COM port of your local PC.

In the **Dial String** field, enter the AT command for dialing (ATDT) plus the phone number of the remote ProxyServer.

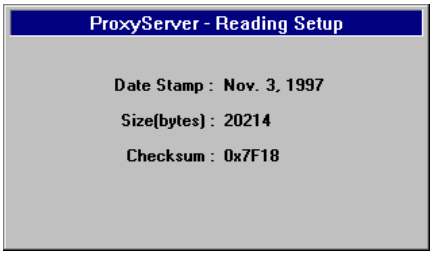
If your Modem Initialization String, Initialization Response, or Connect Response values are different than the defaults in the dialog box, refer to your modem user documentation and change the default values to match your modem.

Click **OK** when you are satisfied with your selections.

6 Run the Proxy Server Configuration program. Click **Start | Programs | Proxy Server 2.01 | Proxy Server Configuration**, or double click on the **Proxy Server Configuration** icon in the Proxy Server 2.01 program group.

7 The **Dialing Router** dialog box is displayed while software is dialing the remote ProxyServer.

8 The **Reading Setup** dialog box is displayed.



9 The **Proxy Setup** menu is displayed. This is the dialog box of the remote ProxyServer. Refer to the on-line help provided with your software for a description of each dialog box and field within a dialog box.

10 After you have changed the configuration of the remote ProxyServer, click **Download Setup** to update the configuration. The remote ProxyServer will be brought down, the new configuration written to the unit, and the unit will reboot.

11 Click **Exit** when the downloading is complete.

12 The **Hangup connection with Router?** dialog box is displayed

Click **Yes** to disconnect the phone connection to the remote site.

13 If the same telephone number is not going to be used again in the immediate future, you may want to remove it from the Port Setup dialog box.

14 At the remote site, reconnect the ProxyServer to the serial port of the PC and from the Proxy Server 2.01 program group double click on the **Proxy Server Configuration** icon to verify that the ProxyServer is running.

LAN-Based Remote Configuration Procedure

Windows Sockets Compliant TCP/IP Stack

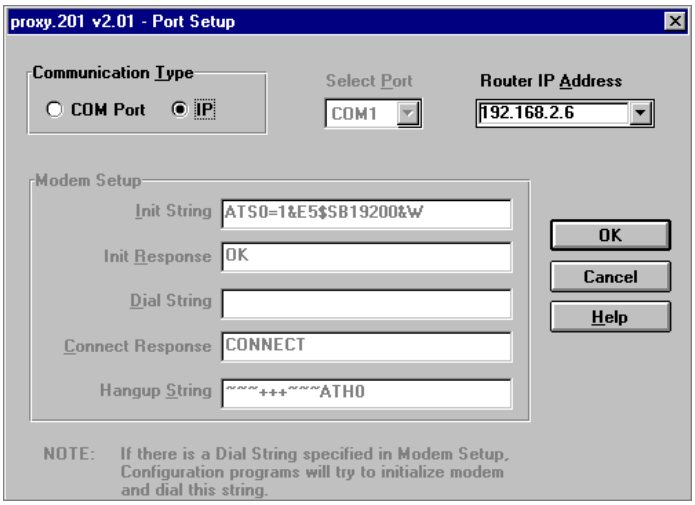
The configuration program requires a Windows Sockets compliant TCP/IP stack. TCP/IP protocol software must be installed and functional before the configuration program can be used.

1 You must assign an Internet (IP) address for the PC and for each node that will be managed by the configuration program. Refer to the protocol software documentation for instructions on how to set the IP addresses.

Once you have completed this step, you should be able to use the protocol Ping command for the PC host name. You should also test the network interface configuration by Pinging another TCP/IP device that is connected to the network.

2 Install the Proxy Server software on the local PC. When installed click **Start | Programs | Proxy Server 2.01 | Configuration Port Setup**, or double click on the **Configuration Port Setup** icon in the **Proxy Server 2.01** program group.

3 The ProxyServer Setup dialog box is displayed.



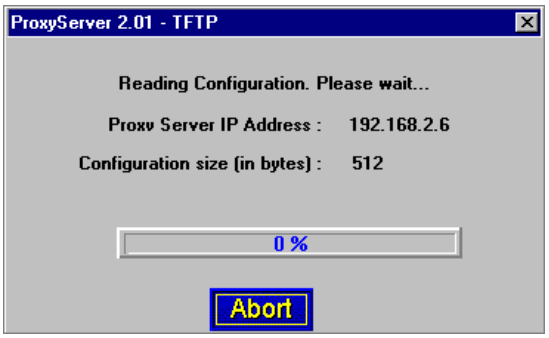
Verify that the **Communication Type** field is set **IP.**

In the **Router IP Address** field, enter the IP Address of the remote ProxyServer.

4 Click **OK** when you are satisfied with your selections.

5 Run the Proxy Server Configuration program. Click **Start | Programs | Proxy Server 2.01 | Proxy Server Configuration**, or double click on the **Proxy Server Configuration** icon in the **Proxy Server 2.01** program group.

The **Reading Setup** dialog box is displayed.



6 The **Proxy Setup** dialog box is displayed. This is the dialog box of the remote ProxyServer. Refer to the on-line help provided with your ProxyServer for the definition of each dialog box and field within a dialog box.

7 After you have changed the configuration of the remote ProxyServer, click **Download Setup** to update the configuration. The remote ProxyServer will be brought down, the new configuration written to the unit, and the unit will reboot.

8 Click **Exit** when the downloading is complete.

9 Double click on the **Proxy Server Configuration** icon in the **Proxy Server 2.01** program group to verify that the ProxyServer is running.

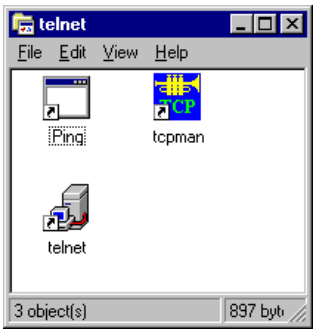
Remote Management

This section describes typical client applications that can be used to configure the ProxyServer remotely. It is important to note that although any subsequent changes to configuration can be made using these applications, the initial setup and configuration of the ProxyServer must be done on the local PC, using the ProxyServer software provided with your unit.

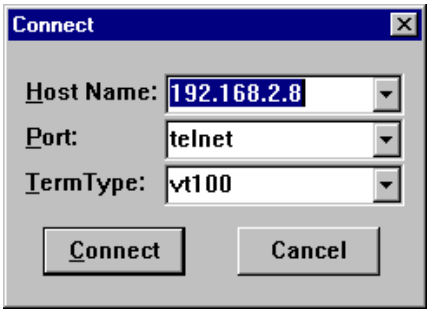
Although establishing access to the ProxyServer varies between applications, the configuration functions mirror those of the ProxyServer software. For more information on ProxyServer software, refer to Chapter 4 - Proxy Server Software.

Telnet

A typical Telnet client application is described in this chapter. The DSU ProxyServer has a built-in Telnet Server that enables Telnet client PCs to access the ProxyServer. A typical Telnet client is allowed to configure the ProxyServer and WAN devices. A typical TCP/IP program group is shown below with a Tcpman icon and a Telnet icon.



The TCP/IP stack has to be loaded before the Telnet client (a Windows application) will run. The Telnet Server option has to be selected from the Applications Setup dialog box using the Proxy Server Configuration icon. Double click on the **Telnet** icon (or shortcut) and a blank Telnet screen is displayed. Click **Connect | Remote System** and the Connect dialog box is displayed. Select (or enter) a **Host Name** (the IP address of the ProxyServer). In this example, the Host Name is 192.168.2.8.



When you enter a valid Host Name (IP address) and click on the Connect button, you are immediately connected to the target ProxyServer and the Proxy Server Management Menu screen is displayed.

Proxy Server Management Menu

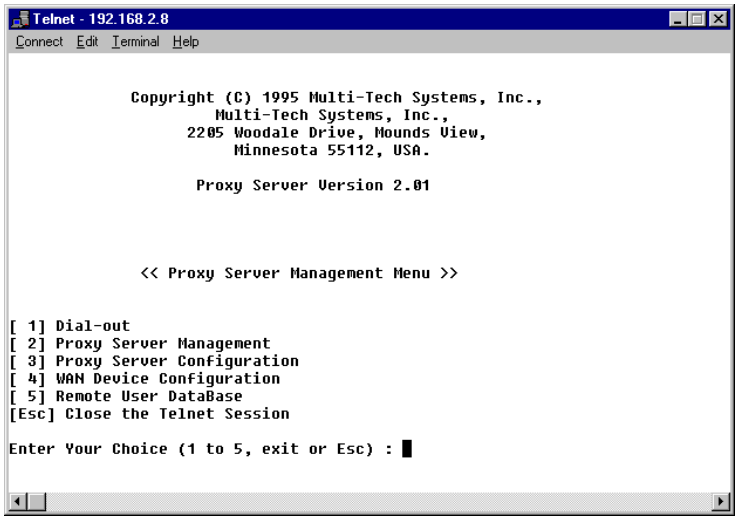
The Proxy Server management menu provides five basic options: Dial-out, Proxy Server Management, Proxy Server Configuration, WAN Device Configuration, and Remote User Data Base. A further option enables you to close the Telnet session from this menu by pressing the Esc key.

Dial-out

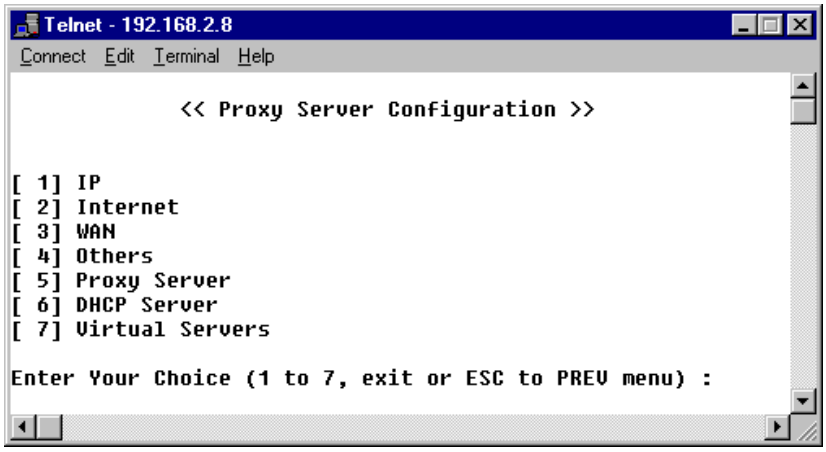
Selecting **Option 1** displays the **Dial-out Ports** menu which shows whether the ProxyServer's one WAN port (Port 1) is currently available for dialing out.

Proxy Server Management

Selecting **Option 2** displays the **Proxy Server Management** menu with options that enable you to obtain proxy statistics, obtain system information, or reset the ProxyServer.



Entering **Option 3** on the Proxy Server Management Menu opens the P**roxy Server Configuration** menu.



Proxy Server Configuration

This menu provides options that correspond to seven buttons on the Proxy Setup screen or Main Menu. They include IP, Internet, WAN, Others, Proxy Server, DHCP Server, and Virtual Servers.

WAN Device Configuration

The WAN Device Configuration option enables you to gain direct access to the ISDN Line on the WAN port in WANTalk mode.

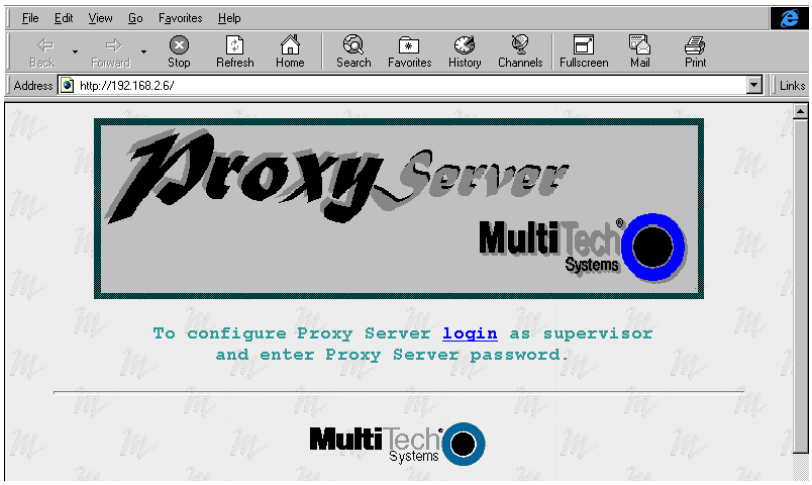
Remote User Data Base

Selecting **Option 5** displays the **Remote User Data Base** menu which enables you to add a User Name and associated parameters to the database.

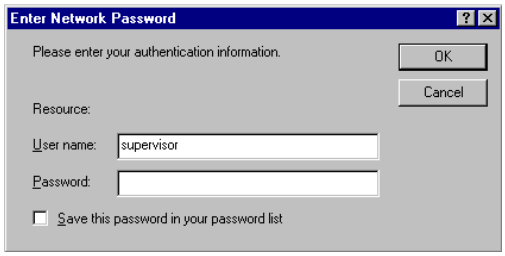
WEB Management

The ProxyServer can be accessed, via a standard web-browser, from anywhere on the connected Internet. In order to provide this support, the **WEB Server** option has to be enabled in the **Applications Setup** dialog box (see Chapter 4 - Proxy Server Configuration, Applications).

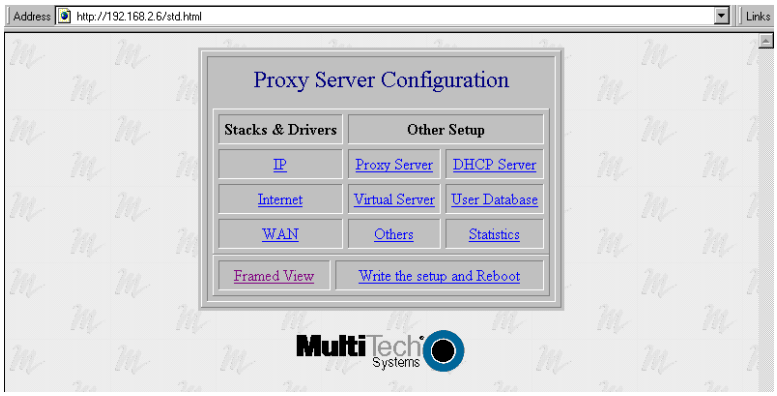
Once enabled, users can access the ProxyServer by entering its IP address in the destination field of their web browser. The following screen appears.



Click on the word 'login' to log in to the ProxyServer configuration program. The **Enter Network Password** screen is displayed.



Type **supervisor** in the **User Name** field (no password needed) and click **OK**. The **ProxyServer Configuration** screen is displayed.



From this screen you can access all the configuration options. Refer to Chapter 4 - ProxyServer Software, for a description of the various options.

ProxyServer
Internet Access with 56K DSU

Chapter 6 - Warranty, Service and Tech Support

MultiTech® Systems

Introduction

This chapter starts out with statements about your Dual Ethernet ProxyServer 2-year warranty. The next section, Tech Support, should be read carefully if you have questions or problems with your ProxyServer. It includes the technical support telephone numbers, space for recording your product information, and an explanation of how to send in your ProxyServer should you require service. The final three sections explain how to use our bulletin board service (BBS), and get support through CompuServe and the Internet.

Limited Warranty

Multi-Tech Systems, Inc. (“MTS”) warrants that its products will be free from defects in material or workmanship for a period of two years from the date of purchase, or if proof of purchase is not provided, two years from date of shipment. MTS MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by the customer or any party without MTS’s written authorization, or used in any manner inconsistent with MTS’s instructions.

MTS’s entire obligation under this warranty shall be limited (at MTS’s option) to repair or replacement of any products which prove to be defective within the warranty period, or, at MTS’s option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS’s factory transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PURCHASE PRICE FOR DEFECTIVE PRODUCTS.

On-line Warranty Registration

To register your ProxyServer on-line, click on the following link:

http://www.multitech.com/register

Tech Support

Multi-Tech has an excellent staff of technical support personnel available to help you get the most out of your Multi-Tech product. If you have any questions about the operation of this unit, call 1-800-972-2439. Please fill out the ProxyServer information (below), and have it available when you call. If your ProxyServer requires service, the tech support specialist will guide you on how to send in your ProxyServer (refer to the next section).

Recording ProxyServer Information

Please fill in the following information on your Multi-Tech ProxyServer. This will help tech support in answering your questions. (The same information is requested on the Warranty Registration Card.)

Model No.: _____
Serial No.: _____
Software Version: _____

The model and serial numbers are on the bottom of your ProxyServer.

Please note the type of external link device that is connected to your ProxyServer before calling tech support. Also, note the status of your ProxyServer including LED indicators, screen messages, diagnostic test results, DIP-Switch settings, problems with a specific application, etc. Use the space below to note the ProxyServer status:

_____

_____

_____

_____

_____

_____

_____

_____

Service

If your tech support specialist decides that service is required, your ProxyServer may be sent (freight prepaid) to our factory. Return shipping charges will be paid by Multi-Tech Systems.

Include the following with your ProxyServer:

- a description of the problem.
- return billing and return shipping addresses.
- contact name and phone number.
- check or purchase order number for payment if the ProxyServer is out of warranty. (Check with your technical support specialist for the standard repair charge for your ProxyServer).
- if possible, note the name of the technical support specialist with whom you spoke.

If you need to inquire about the status of the returned product, be prepared to provide the **serial number** of the product sent.

Send your ProxyServer to this address:

MULTI-TECH SYSTEMS, INC.
2205 WOODALE DRIVE
MOUNDS VIEW, MINNESOTA 55112
ATTN: SERVICE OR REPAIRS

You should also check with the supplier of your ProxyServer on the availability of local service and/or loaner units in your part of the country.

The Multi-Tech BBS

For customers who do not have Internet access, Multi-Tech maintains a bulletin board system (BBS). Information available from the BBS includes new product information, product upgrade files, and problem-solving tips. The phone number for the Multi-Tech BBS is (800) 392-2432 (USA and Canada) or (612) 785-3702 (international and local).

The BBS can be accessed by any asynchronous modem operating at 1200 bps to 56K bps at a setting of 8 bits, no parity, and 1 stop bit (8-N-1).

To Log on to the Multi-Tech BBS

1. Set your communications program to **8-N-1**.
2. Dial our BBS at (800) 392-2432 (USA and Canada) or (612) 785-3702 (international and local).
3. At the prompts, type your first name, last name, and password; then press ENTER. If you are a first time caller, the BBS asks if your name is spelled correctly. If you answer yes, a questionnaire appears. You must complete the questionnaire to use the BBS on your first call.
4. Press ENTER until the Main Menu appears. From the Main Menu you have access to two areas: the Files Menu and News. For help on menu commands, type **?**.

To Download a File

If you know the file name

1. From the Main Menu, type **F** to access the Files Menu, then type **D**.
2. Enter the name of the file you wish to download from the BBS.
3. If a password is required, enter the password.
4. Answer **Y** or **N** to the automatic logoff question.
5. Select a file transfer protocol by typing the indicated letter, such as **Z** for Zmodem (the recommended protocol).
6. If you select Zmodem, the transfer will begin automatically. If you select another protocol, you may have to initiate the transfer yourself. (In most data communications programs, the PAGE DOWN key initiates the download.)
7. When the download is complete, press ENTER to return to the File Menu.
8. To exit the BBS, type **G** and press ENTER.

If you don’t know the file name

1. From the Main Menu, type **F** to access the Files Menu. For a list of file areas, type **L**, press ENTER, then type **L** and press ENTER again. (If you do not type the second *L*, you will list all of the files on the BBS.)
2. Mark each file area you would like to examine by typing its list number and pressing ENTER.
3. Enter **L** to list all the files in the selected file areas. Enter **C** to go forward in the file list and **P** to go back.
4. To mark one or more files for download, type **M**, press ENTER, type the list numbers of the files, and press ENTER again.

5. Enter **D**. You will see a list of the files you have marked. Enter **E** if you would like to edit the list; otherwise enter **D** again to start the download process.
6. Select a file transfer protocol by typing the indicated letter, such as **Z** for Zmodem (the recommended protocol).
7. If you select Zmodem, the file will transfer automatically. If you select another protocol, you may have to initiate the transfer yourself. (In most data communications programs, the PAGE DOWN key initiates the download.)
8. When the download is complete, press ENTER to return to the File Menu.
9. To exit the BBS, type **G** and press ENTER.

About CompuServe

In addition to the BBS, Multi-Tech provides support through CompuServe's Modem Vendor Forum (GO MODEMVEN). Refer to your Compuserve documentation for special operating procedures.

About the Internet

Multi-Tech is a commercial user on the Internet, and we retrieve messages from our customers on a periodic basis. If you prefer to receive technical support via the Internet, you can contact Tech Support at the following address:

http://www.multitech.com/_forms/email_tech_support.htm

Multi-Tech's presence includes a Web site at:

http://www.multitech.com

and an ftp site at:

ftp://ftp.multitech.com

About the Multi-Tech Fax-Back Service

Multi-Tech's fax-back system provides 24-hour access to sales, marketing, and technical literature. Dial 612-717-5888, follow the voice prompts, and request document number 10 for a catalog of available documents. For convenience, have your fax number handy: _____. From the catalog of available documents, you can order newsletters, white papers, press releases, etc. from the sales and marketing index (pages 1-4), or order basic modem operation and troubleshooting guides from the technical support and engineering index. Just enter the applicable FB Doc. # from the left column of the catalog.

ProxyServer
Internet Access with 56K DSU

Appendixes

MultiTech® Systems

Appendix A - TCP/IP (Transmission Control Protocol/Internet Protocol) Description

TCP/IP is a protocol suite and related applications developed for the U.S. Department of Defense in the 1970s and 1980s specifically to permit different types of computers to communicate and exchange information with one another. TCP/IP is currently mandated as an official U.S. Department of Defense protocol and is also widely used in the UNIX community.

Before you install TCP/IP on your network, you need to establish your Internet addressing strategy. First, choose a domain name for your company. A domain name is the unique Internet name, usually the name of your business, that identifies your company. For example, Multi-Tech's domain name is multitech.com (.com indicates this is a commercial organization; .edu denotes educational organizations, .gov denotes government organizations). Next, determine how many IP addresses you'll need. This depends on how many individual network segments you have, and how many systems on each segment need to be connected to the Internet. You'll need an IP address for each network interface on each computer and hardware device.

IP addresses are 32 bits long and come in two types: network and host. Network addresses come in five classes: A, B, C, D, and E. Each class of network address is allocated a certain number of host addresses. For example, a class B network can have a maximum of 65,534 hosts, while a class C network can have only 254. The class A and B addresses have been exhausted, and the class D and E addresses are reserved for special use. Consequently, companies now seeking an Internet connection are limited to class C addresses.

Early IP implementations ran on hosts commonly interconnected by Ethernet local area networks (LAN). Every transmission on the LAN contains the local network, or medium access control (MAC), address of the source and destination nodes. The MAC address is 48-bits in length and is non-hierarchical; MAC addresses are never the same as IP addresses.

When a host needs to send a datagram to another host on the same network, the sending application must know both the IP and MAC addresses of the intended receiver. Unfortunately, the IP process may not know the MAC address of the receiver. The Address Resolution Protocol (ARP), described in RFC 826 (located at ftp://ds.internic.net/rfc/rfc826.txt) provides a mechanism for a host to determine a receiver's MAC address from the IP address. In the process, the host sends an ARP packet in a frame containing the MAC broadcast address; and then the ARP request advertises the destination IP address and asks for the associated MAC address. The station on the LAN that recognizes its own IP address will send an ARP response with its own MAC address. An ARP message is carried directly in an IP datagram.

Other address resolution procedures have also been defined, including those which allow a diskless processor to determine its IP address from its MAC address (Reverse ARP, or RARP), provides a mapping between an IP address and a frame relay virtual circuit identifier (Inverse ARP, or InARP), and provides a mapping between an IP address and ATM virtual path/channel identifiers (ATMARP).

The TCP/IP protocol suite comprises two protocols that correspond roughly to the OSI Transport and Session Layers; these protocols are called the Transmission Control Protocol and the User Datagram Protocol (UDP). Individual applications are referred to by a port identifier in TCP/UDP messages. The port identifier and IP address together form a "socket". Well-known port numbers on the server side of a connection include 20 (FTP data transfer), 21 (FTP control), 23 (Telnet), 25 (SMTP), 43 (whois), 70 (Gopher), 79 (finger), and 80 (HTTP).

TCP, described in RFC 793 (ftp://ds.internic.net/rfc/rfc793.txt) provides a virtual circuit (connection-oriented) communication service across the network. TCP includes rules for formatting messages, establishing and terminating virtual circuits, sequencing, flow control, and error correction. Most of the applications in the TCP/IP suite operate over the "reliable" transport service provided by TCP.

UDP, described in RFC 768 (ftp://ds.internic.net/rfc/rfc768.txt) provides an end-to-end datagram (connectionless) service. Some applications, such as those that involve a simple query and response, are better suited to the datagram service of UDP because there is no time lost to virtual circuit establishment and termination. UDP's primary function is to add a port number to the IP address to provide a socket for the application.

The Application Layer protocols are examples of common TCP/IP applications and utilities, which include:

- Telnet (Telecommunication Network): a virtual terminal protocol allowing a user logged on to one TCP/IP host to access other hosts on the network, described in RFC 854 (ftp://ds.internic.net/rfc/rfc854.txt).
- FTP: the File Transfer Protocol allows a user to transfer files between local and remote host computers per IETF RFC 959 (ftp://ds.internic.net/rfc/rfc959.txt).
- Archie: a utility that allows a user to search all registered anonymous FTP sites for files on a specified topic.
- Gopher: a tool that allows users to search through data repositories using a menu-driven, hierarchical interface, with links to other sites, per RFC 1436 (ftp://ds.internic.net/rfc/rfc1436.txt).
- SMTP: the Simple Mail Transfer Protocol is the standard protocol for the exchange of electronic mail over the Internet, per IETF RFC 821 (ftp://ds.internic.net/rfc/rfc821.txt).
- HTTP: the Hypertext Transfer Protocol is the basis for exchange of information over the World Wide Web (WWW). Various versions of HTTP are in use over the Internet, with HTTP version 1.0 (per RFC 1945) (ftp://ds.internic.net/rfc/rfc1945.txt) being the most current.
- HTML: WWW pages are written in the Hypertext Markup Language (HTML), an ASCII-based, platform-independent formatting language, per IETF RFC 1866 (ftp://ds.internic.net/rfc/rfc1866.txt).
- Finger: used to determine the status of other hosts and/or users, per IETF RFC 1288 (ftp://ds.internic.net/rfc/rfc1288.txt).
- POP: the Post Office Protocol defines a simple interface between a user's mail reader software and an electronic mail server; the current version is POP3, described in IETF RFC 1460 (ftp://ds.internic.net/rfc/rfc1460.txt).
- DNS: the Domain Name System defines the structure of Internet names and their association with IP addresses, as well as the association of mail, name, and other servers with domains.
- SNMP: the Simple Network Management Protocol defines procedures and management information databases for managing TCP/IP-based network devices. SNMP, defined by RFC 1157 (ftp://ds.internic.net/rfc/rfc1157.txt) is widely deployed in local and wide area network. SNMP Version 2 (SNMPv2), per RFC 1441< ftp://ds.internic.net/rfc/rfc1441.txt) adds security mechanisms that are missing in SNMP, but is also more complex.
- Ping: a utility that allows a user at one system to determine the status of other hosts and the latency in getting a message to that host. Ping uses ICMP Echo messages.
- Whois/NICNAME: Utilities that search databases for information about Internet domain and domain contact information, per RFC 954 (ftp://ds.internic.net/rfc/rfc954.txt).
- Traceroute: a tool that displays the route that packets will take when traveling to a remote host.

Internet Protocol (IP)

IP is the Internet standard protocol that tracks Internetwork node addresses, routes outgoing messages and recognizes incoming messages, allowing a message to cross multiple networks on the way to its final destination. The IPv6 Control Protocol (IPV6CP) is responsible for configuring, enabling, and disabling the IPv6 protocol modules on both ends of the point-to-point link. IPV6CP uses the same packet exchange mechanism as the Link Control Protocol (LCP). IPV6CP packets are not exchanged until PPP has reached the Network-Layer Protocol phase. IPV6CP packets received before this phase is reached are silently discarded. (See also TCP/IP.)

Before you install TCP/IP on your network, you need to establish your Internet addressing strategy. You first choose a domain name for your company. A domain name is the unique Internet name, usually the name of your business, that identifies your company. For example, Multi-Tech's domain name is multitech.com (where .com indicates this is a commercial organization; .edu denotes educational organizations, .gov denotes government organizations). Next, you determine how many IP addresses you'll need. This depends on how many individual network segments you have, and how many systems on each segment need to be connected to the Internet. You need an IP address for each network interface on each computer and hardware device.

IP addresses are 32 bits long and come in two types: network and host. Network addresses come in five classes: A, B, C, D, and E. Each class of network address is allocated a certain number of host addresses. For example, a class B network can have a maximum of 65,534 hosts, while a class C network can have only 254. The class A and B addresses have been exhausted, and the class D and E addresses are reserved for special use. Consequently, companies now seeking an Internet connection are limited to class C addresses. The current demand for Internet connections will exhaust the current stock of 32-bit IP addresses. In response, Internet architects have proposed the next generation of IP addresses, Ipng (IP Next Generation). It will feature 16-byte addressing, surpassing the capacities of 32-bit IP. Still in its design phase, IPng is not expected to be widely deployed before late 1997.

An IP address can serve only a single physical network. Therefore, if your organization has multiple physical networks, you must make them appear as one to external users. This is done via "subnetting", a complex procedure best left to ISPs and others experienced in IP addressing. Since IP addresses and domain names have no inherent connection, they are mapped together in databases stored on Domain Name Servers (DNS). If you decide to let an Internet Service Provider (ISP) administer your DNS server, the ISP can assist you with the domain name and IP address assignment necessary to configure your company's site-specific system information. Domain names and IP addresses are granted by the InterNIC. To check the availability of a specific name or to obtain more information, call the InterNIC at (703)742-4777.

Appendix B - Scripting

The script file can be used to automate certain operation. The script file is a text file containing a sequence of commands. The structure of a script file is succinctly expressed by the following grammar.

Script Language Grammar

<program> =<declarations> <proc_declarations>
<declarations> ={<var_type> <identifier> {, <indentifier> } ; }
<var_type> =INTEGER I STRING
<statement_list> ={<statement>}
<statement> =<elementary_statement> I <if_statement> I<for_statement> I
<while_statement> I <switch_statement>
<if_statement> =IF <expression> THEN <statement_list> {ELSE<statement_list> }
ENDIF
<for_statement> =FOR <indentifier>=<expression> TO IDOWNTO <expression} STEP
<expression> / DO <statement_list> ENDFOR
<while_statement> =WHILE <expression> DO <statement_list> ENDWHILE
<switch_statement>=SWITCH <expression> {CASE <integer_const> <statement_list> I
CASE <string_const> <statement_list> I
DEFAULT <statement_list> }
ENDSWITCH
<elementary_statement> =<identifier> = <expression> ; I <identifier> / (<expression>
{,<expression> }) /; I GOTO <identifier> ; I <identifier> : I ;
<expression> =<expression> OPERATOR <expression> I {<expression> } I /
<expression>I
- <expression> I<identifier> / (<expression> {, <expression> }) /
OPERATOR = **<** I **<=** I > I >= I == I **!**= I **&&** I II I **+** I - I * I / I **!**
<proc_declaration> =PROC <identifier>/(<parameter_list>)} { :<vartype> };FORWARD ;
<proc_declaration> =PROC <identifier>/(<parameter_list>)} / : <vartype> / ;
<declarations> <statement_list>ENDPROC
<parameter_list> =<argument_list> { ; <argument_list>}
<argument_list> ={VAR} <var_type> <identifier> {<identifier>}

Execution starts at the PROC main. PROC main cannot have any arguments. All the variables have to be declared before use. All procedures must be declared before calling. Recursion is allowed in procedures.

To define mutually recursive procedures, use the FORWARD directive to indicate that the procedure body is defined later in the source file. Procedures defined with the FORWARD directive should have all the parameters and return value (if any) specified, the actual definition of the procedure body should not contain the formal parameter list or the return value. An example of forward defined procedures is given below:

```
proc a(integer x,y) : integer,forward:
proc b(integer u,v) : integer,forward:
proc a;
    integer t;
    /*Some more code here. */

    t=b(x,y);
    /*Some more code here. */
    return(t);
endproc

proc b;
    return(a(u,v);
endproc
```

Argument to procedures can be passed by value or address. To pass an argument by address, prefix the argument name in the formal parameter list by the keyword VAR; otherwise the argument is passed by value. Only variables can be passed by address. Expressions like A+B, where A and B are integer variables can be passed by value but cannot be passed by address.

Two basic types of variables are supported:

INTEGER and STRING

In the STRING, since the ASCII null character is internally used to indicate the end of the sequence, it cannot be part of the string. All other characters, including extended ASCII characters can be part of the string.

There are two types of conditional constructs:

IF and SWITCH

The IF statement is a two-way branching construct. The condition can be an arbitrary expression. The condition in the IF statement should evaluate to an integer or real. If the expression in the IF statement evaluates to non-zero, the control enters the THEN statement, otherwise control enters the ELSE statement.

The SWITCH statement is a multi-way branching construct. The type of conditional expression should be either INTEGER or STRING. The value of the conditional expression is matched against the constrants given in the CASE options, if the value matches a CASE option value, control enters that CASE option. If the values do not match any of the CASE options, and if a DEFAULT option is provided, control continues at the DEFAULT option; otherwise control continues at the statement after the ENDSWITCH. If control enters one of the CASE or DEFAULT statements, all the statements up to the next ENDCASE statement are executed. Each CASE or DEFAULT statement should be terminated by a matching ENDCASE keyword. The SWITCH statement should be terminated by a ENDSWITCH keywork. The DEFAULT statement can be placed anywhere within the scope of the SWITCH statement. There can be only one DEFAULT statement.

There are two types of iterative contructs:

FOR and WHILE

The FOR construct sets the loop control variable to an initial value. The control variable is checked for bounds, and if within bounds, the <statement_list> given is executed; otherwise the loop execution terminates. After each execution of <statement_list>, the control variable is incremented or decremented by a certain value. This is computed as follows: if the STEP expression is given it is the value of the expression, else it is 1. The control variable is incremented if TO is specified, and is decremented if DOWNTO is specified. After updating the control variable the bounds check is done again. The keyword ENDFOR is mandatory at the end of the loop.

The WHILE loop has an expression and a <statement_list>. The expression is evaluated and if the expression is non-zero the <statment_list> is executed; otherwise the loop execution terminates. The keyword ENDWHILE is mandatory at the end of the loop.

Operator Precedence:

Operators are listed in the order of precedence

Unary Operators :-!(unary minus, logical negation)
Binary Operators :*/ **+ _< > <= >= == ! = &&** II

All the operators are left associative. Expressions are evaluated completely; so care must be taken while writing expressions. For example, expressions like (a !=0 && b / a) would create run time error.

Script Commands (by Function)

Dial, Connection and Remote

BAUDRATE	BREAK	GETCTS
GETDCD	HANGUP	PARITY
RGETC	RGETS	RXFLUSH
SETDTR	SETRTS	STOPBITS
THISLAYERUP	TRANSMIT	TXFLUSH
WAITFOR		

Mathematical functions

DEC	INC

Miscellaneous

EXIT	WAIT

Program constructs

FOR	IF	PROC
SWITCH	WHILE	

String operations

ATOI	ITOA	STRCAT
STRCMP	STRCOPY	STRFMT
STRLEN	TOLOWER	TOUPPER

Example Script:

```
proc main;
    string login_prompt;
    string user_name;
    string password_prompt;
    string password;
    string shell_menu;
    string shell_menu_response;
    integer timeout;

    timeout=10;
    login_prompt="login:";
    user_name="user1";
    password_prompt="Password:";
    password="user1";
    shell_menu="choice:";
    shell_menu_response="1";

    transmit("A");
    wait(1)
    transmit("T^M");
    waitfor ("OK",10);

    transmit ("A");
    wait (1);
    transmit ("T");
    wait (1);
    transmit ("DT963^M");

    if (waitfor (login_prompt,60))  then
            transmit (user_name);
            transmit ("^M");
            if (waitfor (password_prompt,timeout))  then
                    transmit (password);
                    transmit ("^M");
                    if (waitfor (shell_menu,timeout))  then
                    transmit (shell_menu_response);
                    transmit ("^M");
    else
                    transmit ("Shell Menu Not Received^M");
    endif
else
    transmit ("Password Prompt Not Received^M");
    endif
else
    transmit ("Login Prompt Not Received^M");
endif

Endproc
```

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